Docket No.: 0267-1904(41912)

LOCKOUT MECHANISM FOR RESIDUAL CURRENT DEVICES

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. provisional application no. 60/277,097, filed on March 19, 2001. This application is related to application Serial No. 09/379,138 filed August 20, 1999, which is a continuation-in-part of application Serial No. 09/369,759 filed August 6, 1999, which is a continuation-in-part of application Serial No. 09/138,955, filed August 24, 1998, now U.S. Patent No. 6,040,967, all of which are incorporated herein in their entirety by reference, and related to application Serial No. 09/379,138 filed August 20, 1999, which is a continuation-in-part of application Serial No. 09/369,759 filed August 6, 1999, which is a continuation-in-part of application Serial No. 09/138,955, filed August 24, 1998, now U.S. Patent No. 6,040,967, all of which are incorporated herein in their entirety by reference.

BACKGROUND

1. Field

The present application is directed to resettable residual current devices (RCDs). More particularly, the present application is directed to a RCD that can lockout the reset function if a predetermined condition exists.

2. Description of the Related Art

Many electrical wiring devices have a line side, which is connectable to an electrical power supply, and a load side, which is connectable to one or more loads and at least one conductive path between the line and load sides. Electrical connections to wires supplying electrical power or wires conducting electricity to the one or more loads are at line side and load side connections. The electrical wiring device industry has witnessed an increasing call for circuit breaking devices or systems which are designed to interrupt power to various loads, such as household appliances, consumer electrical products and branch circuits. Presently available GFCI devices, such as the device described in commonly owned U.S. Patent 4,595,894, use an electrically activated trip mechanism to mechanically break an electrical connection between the line side and the load side. Commonly owned application Serial No. 09/138,955, filed August 24, 1998, now U.S. Patent No. 6,040,967, which is incorporated herein in its entirety by reference, describes a family of resettable circuit interrupting devices capable of locking out the reset portion of the device if the circuit interrupting portion in certain circumstances.

SUMMARY

The present application relates to a resettable RCD that may be locked out from reset. A user actuated reset lever moves from an off state to an on state through a test state. The test state will test the device and only allow progression to the on state if the test passes.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present application are described herein with reference to the drawings in which similar elements are given similar reference characters, wherein:

Fig. 1 is a schematic representation of the operation of an RCD in a failed condition according to the present application; and

Fig. 2 is a schematic representation of the operation of an RCD in a passed condition according to the present application.

DETAILED DESCRIPTION OF EMBODIMENTS

The present application contemplates various types of circuit interrupting devices that are capable of breaking at least one conductive path at both a line side and a load side of the device. In particular, a shim that will allow operation of an RCD is only allowed to move into operating position if a test passes.

Turning now to Fig. 1, the relevant portions of the RCD are depicted, showing the motion of the mechanism as from an off state to an on state through an intermediate test state. The invention provides a non engagement (lock-out) mechanism for residual current devices (RCD Breakers).

The RCD unit 100 starts in a tripped state with the user handle 110 in the off

position 1. The user operated reset handle or rocker 110 can be moved in direction A from an off state 1 to a test state 2. The handle 110 will move compression arm 120 such that switch 130 is closed by contact 132 connecting with contact 134. Then a test of the device will occur using the test circuit (not shown). If the test fails, the solenoid 150 will not move magnet 160 that is biased by spring 152 and the shim 140 will stay in place. Accordingly, the switch 175 will not close contacts 170 and 180 and the device will not pass current and will remain in the off state. When shim 140 stays in place, the magnet 160 will not allow the relay 100 to operate. Relay 195 is normally biased closed, but the magnet will hold it open.

Referring now to FIG. 2, the device is shown in the state if the test passes. As can be appreciated, if the test switch 130 causes the solenoid 150 to fire, the magnet 160 will be pulled against spring 152 and the shim 140 will move down in direction B such that the shim will come down between the solenoid magnet 160 and magnet 190 so that the relay will work normally and the handle can progress to the on state. The normally closed relay 195 will then close.

As noted, although the components used during circuit interrupting and device reset operations are electro-mechanical in nature, the present application also contemplates using electrical components, such as solid state switches and supporting circuitry, as well as other types of components capable or making and breaking electrical continuity in the conductive path.

While there have been shown and described and pointed out the fundamental features of the invention, it will be understood that various omissions and substitutions

and changes of the form and details of the device described and illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention.